



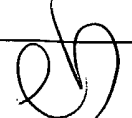
# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,669	12/28/2001	Junichi Fujikata	SHM-01901	7978
26339	7590	08/02/2004	EXAMINER	
PATENT GROUP CHOATE, HALL & STEWART EXCHANGE PLACE, 53 STATE STREET BOSTON, MA 02109			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Advisory Action</b>	<b>Application No.</b> 10/033,669	<b>Applicant(s)</b> FUJIKATA ET AL.	
	<b>Examiner</b> Kevin M Bernatz	<b>Art Unit</b> 1773	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 15 July 2004 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

**PERIOD FOR REPLY [check either a) or b)]**

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.  
**ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).**

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on \_\_\_\_\_. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.  
2. ☐ The proposed amendment(s) will not be entered because:  
(a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ they raise the issue of new matter (see Note below);  
(c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_.

3. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
4. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
5. ☒ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.  
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.  
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☐ will not be entered or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: none.

Claim(s) objected to: none.

Claim(s) rejected: 1-16 and 23-29.

Claim(s) withdrawn from consideration: none.

8. ☐ The drawing correction filed on \_\_\_\_\_ is a) ☐ approved or b) ☐ disapproved by the Examiner.  
9. ☒ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). 5/3/2004.  
10. ☐ Other: \_\_\_\_\_

Continuation of 5. does NOT place the application in condition for allowance because: applicants' arguments are found unconvincing. Specifically, the Examiner notes that there appears to be some confusion over the Portier et al. reference and how it is relied upon in the rejection of record. In an interesting in furthering prosecution, the Examiner will attempt to better explain the use of the Portier et al. reference and invites applicants to call if further clarification is required.

The Examiner notes that all the claims are rejected under the references Araki et al. ('081 A1) in view of Araki et al. ('675). Araki et al. ('081 A1) is relied upon as the base reference and teaches a MR element substantially identical in structure to applicants claimed and disclosed invention (see Paragraph 3 of the Office Action mailed 4/22/04). Araki et al. ('081 A1) further teach surface roughness magnetudes for the underlayer meet applicants' claimed magnetudes (e.g. Abstract) and Araki et al. ('675) teach that all the underlayers impact the roughness of the subsequent layers are tend to be similar in roughness since it is the surface roughness of the tunnel barrier layer which is most critical (col. 2, lines 26 - 39 and col. 3, lines 5 - 7 and page 5 of the rejection of 4/22/04). I.e. both Araki et al. references teach forming a structure such that the antiferromagnetic film and the first ferromagnetic film appear to be well bonded to each other across a low surface roughness interface.

The Examiner then took the position that since the antiferromagnetic layer and the first ferromagnetic layer are well bonded to each other across a low surface roughness interface, that the coupling would be strong, while since the second ferromagnetic layer is a soft magnetic film ( Araki et al. '081 A1, layer 20 - NiFe or CoFe, col. 9, lines 45 - 61), the coercivity,  $H_{c2}$ , of the second ferromagnetic layer would be low. As such, the Examiner took the positon in the office action mailed 4/22/04 that the claimed ratio of  $H_{c2} < H_r$  would appear to necessarily flow from the Araki et al. ('081 A1) structure ("the presently claimed properties of " $H_r$  and  $H_{c2}$  satisfy the relationship of  $H_{c2} < H_r$ " (claims 1 and 5) would have necessarily resulted from the disclosed structure because the Examiner has sound basis for believing that the improved bonding would lead to improved exchange coupling").

Portier et al. is not relied upon to teach improved bonding, or to provide any motivation for any modification of the cited references. Portier et al. is provided merely as supporting evidence for why the Examiner felt that the relative property limitation would appear to necessarily flow from the teachings of Araki et al. ('081 A1). Specifically, since Araki et al. ('081 A1) teach an antiferromagnetic film and a first magnetic film coupled across a low surface roughness layer, there is sound basis for believing that the coupling forces would be strong between the two films. Given that the coupling is strong, there is sound basis that the  $H_r$  between the two films would be large, since  $H_r$  is a measure of the exchange coupling force between the two layers. Portier et al. is cited to support the Examiner's position tha since the two films are well bonded to each other, it is reasonable to expect that the magnetude of  $H_r$  would be large while the magnetude of  $H_c$  for a soft magnetic film is small (typically on the order of 1-10 Oe). Again, the Examiner reiterates that no motivation for any modification of the prior art is drawn from the Portier et al. reference and that Portier et al. is merely cited to back up the Examiner's reasoning for why the Examiner believes that the claimed property limitations would be met by the prior art structure.

To state it another way, the Examiner has taken a position that the claimed  $H_{c2} < H_r$  limitation would necessarily result from the Araki et al. structure and has provided Portier et al. to show why the Examiner feels that such a belief is reasonable. Applicants are invited to present evidence that the claimed  $H_{c2} < H_r$  property would not necessarily flow from the Araki et al. ('081 A1) structure, e.g. by providing evidence that the exchange coupling force between the antiferromagnetic layer and the first magnetic layer ( $H_r$ ) would not necessarily be larger than the coercivity of the free magnetic layer ( $H_{c2}$ ).

*Kevin M. Bernatz*  
Kevin M. Bernatz, PhD

7/28/2004